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ABSTRACT

Relationships between students' (N=169) rating of instruction and students' attitudes about inquiry and traditional teaching in elementary science classes were investigated. Since one of the goals of their methods class was to develop or adopt teaching styles on their own, it was hypothesized that the congruence of students' adopted teaching style with that of their elementary science methods instructor would possibly influence their rating of instruction. Two instruments were used in the study: a 21-item course/instructor evaluation form (general course attitude, instructor, course content, interest/attention) and a 20-item instrument relating to inquiry/traditional science teaching based on the "Science Teacher Ideological Preference Scale" (STIPS). Correlations between students' and instructors' beliefs were used to divide students into three groups where instructor/student beliefs were: (1) highly similar; (2) similar; and (3) dissimilar. Results from one-way analyses of variance indicated significant differences related to general course attitude, method of instruction, and overall rating, with no significant differences related to course content, interest/attention, or instructor. Results suggest that students' beliefs about teaching science in elementary school may influence their ratings of course/instruction in some instances but not others. (Author/JN)

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STUDENTS' RATING OF INSTRUCTION IN ELEMENTARY SCIENCE METHODS COURSES

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INTRODUCTION

Today, in higher education, much attention is being given to the evaluation of teachers and teaching, by students. Overall, the areas of student evaluation of instruction continues to be a controversial one. Many colleges and universities have, however, adopted student rating techniques as a means for improving instruction and for rewarding inferred good teaching techniques. Many faculties have, meanwhile, expressed concern about the abilities of students to make valid judgements and about the relationships of instructional ratings to extraneous student and course variables. They have also voiced the possibility that students are not clear as to whether they are rating actual instruction or whether they are expressing their attitudinal preference for certain types of instruction. McKeachie and Kulik (1975) have pointed out that some students are easily pleased and others are never satisfied.

There have been few studies that have dealt specifically with science education and student evaluation of instruction. In fact, there have been no reports on student evaluation in higher education in the last five journal years for the Journal of Research in Science Teaching and Science Education. The bodies of literature dealing with this topic have come from the theory and measurement of attitudes area and include reports such as those by Rosenshine (1973) and Tobias and Hanlon (1975), or from student evaluation literature such as that published by Aleamoni (1978), and Centra (1977).

In one of the most recent reviews of student ratings of instruction and student achievement, Cohen (19811, p. 305) concluded that:

> "Based on the findings of the meta-analysis, we can safely say that student ratings of instruction are a valid index of instructional effectiveness. Students do a pretty good job of distinguishing among teachers on the basis of how much they have learned. Thus, the present study lends support to the use of ratings as one component in the evaluation of teaching effectiveness . . . . . to some extent ratings reflect an instructor's impact on students."

In the same study, (Cohen, 1981, p. 305) he also concluded that, "Perhaps teaching aspects measured by interpersonal dimensions (e.g., rapport, interaction, feedback) are more likely to relate to outcome criteria other than student learning, such as student interest in the subject matter, enrollment in advanced courses, and so forth."

It would seem that since developing positive attitudes toward science and science teaching are an integral part of most methods of teaching science courses, the science education community should pursue investigations of the correlations between instructor's interpersonal characterisitics and students' rating of instruction. Thus, the purpose of the present study was to examine the relationships between students' rating of instruction and students' attitudes about inquiry and traditional teaching in elementary science classes. One of the educational objectives of these classes is for students to develop or adopt vaious teaching styles on their own. It was hypothesized that the congruence of their adopted teaching style with that of their elementary science methods instructor would possibly influence their rating of instruction at the higher education level.

METHODOLOGY

Sample

Subjects for this study were 169 college students enrolled in six elem-

entary science methods classes. This represented all the elementary science methods classes taught during the term of the study. These classes were taught by two different instructors. One was responsible for four of the sections and the other was responsible for two of the sections. The students were juniors, seniors, or students with a BA working on a state certification requirements. They were over 90% female.

Instruments

The instruments utilized in the study were based upon the Science Teacher Ideological Preference Scale (Jones and Harty, 1978) and a course/instructor evaluation questionnaire based on the standard form available at the university where the study was conducted. The Science Teacher Ideological Preference Scale contains twenty items relating to inquiry teaching and traditional science teaching. Examples of items in the two categories are, "The student should figure out on his own the important concepts of the materials being studied rather than receiving them directly from the teacher," and "Science should be taught as a discipline of conclusive and authoritative information which has been verified beyond dispute." It has reported construct validity and internal consistency reliability of between 0.73 and 0.79. Students rate the items on a five point scale -- strongly agree, agree, undecided, disagree, strongly disagree. The course/instructor evaluation questionnaire consists of 21 items relating to general course attitude, instructor, course content, interest and attention, and method of instruction. Two sample items are, "The instructor seemed to consider teaching as a chore or routine activity." and "I learn more when other teaching methods are used." The students rate the items on a four point scale --agree strongly, agree, disagree, disagree strongly. The course/instructor evaluation questionnaire has been used with over 19,000 courses to evaluate student ratings of instruc-

tion.

Data and Analysis Procedures

Both instruments were administered at the same time during the last regular class meeting. The students did not have to put any identifying marks on the instruments. They were also apprised of the fact that the instructor would not be aware of the rating results until after final grades were reported.

The Science Teacher Ideological Preference Scale data were analyzed first. A Pearson r statistic for each student was computed to determine the amount of correlation between student's beliefs and instructor's beliefs. These correlation coefficients were then utilized to divide the students into three groups. Those where instructor-student beliefs were highly similar, those with similar beliefs, and those with dissimilar beliefs. A one-way analysis of variance was used to check for significant differences among the groups in their instructor/course ratings for the five subscales and for the total instructor/course rating score.

RESULTS

The Pearson correlation coefficients ranged from a high of 0.8930 to a low of 0.0267. For the twenty item questionnaire, an r of 0.38 or higher is significant at the 0.05 level. Over 44% of the sample had computed r values which were significant. There were also eight values that were negative. Table 1 shows the distribution of the Pearson product moment correlations for the total sample. The distribution was not determined for each instructor individually. As can be seen from table 1, they represent a quasi-normal distribution of scores.

Insert Table 1 About Here

A total of eighteen one-way analysis of variance analysis were carried out. These involved the five subscale scores and the overall rating score for the total group and for both separate instructor groups. Four of the eighteen analysis showed significant differences beyond the 0.05 level. These related to the subscales of general course attitude, and method of instruction as well as the overall rating. No differences were found for the subscales course content, interest and attention, and instructor. Tables 2 - 4 report the summaries for the analysis of variance tests that were significant. They also report the means and standard deviation for all groups.

DISCUSSION

This study revealed that a students' beliefs about teaching science in the elementary school may influence their ratings of course/instruction at the higher education level in some instances. These results are in agreement with those of researchers such as Brown (1977) and Elmore and Pohlmann (1976) which generally show that student characteristics may influence course/instruction ratings. However, in these studies, different characteristics were assessed and different types of classes were rated. They are in disagreement with another group of studies, such as those by Fuqua and Andre (1977) and Isaacson, et. al. (1963).

When comparing the means and standard deviations for the groups, some interesting results are evident. First of all, for General Course Attitud- with Instructor I and Instructor II, the high means occur for different groups. For Instructor I, students with the lowest instructor-student belief correlation had the highest (best) attitude toward the course. For Instructor II, the opposite is true. Those with the lowest instructor-student belief correlation had the lowest (worse) attitude toward the course. Those with a medium correlation had the best general course attitude. In fact, for

Instructor II, the medium correlation group consistently had the higher scores. This difference in order of scores between instructors evidently influenced the analysis when the total group (N=169) was the focus of the analysis. There were consequently, no significant differences when the total group was considered.

Student rating of courses and instruction at the higher education level is a very complex manner. This is aptly pointed out by the fact that the same significant differences were not found for the total group and for each instructor group in this study. One might, however, have conjectured that a student's beliefs about traditional and inquiry science teaching would more likely affect the subscales where significance was shown. It is less likely that instructor and course content should be differentially affected by these beliefs. Additional research studies are needed to further illuminate these findings.

This study also raises other questions. Maybe it is the student's beliefs alone and not their similarity to the instructor's beliefs that influences their perceptions most. Also, maybe other student or course characteristics interact with their ratings. Additional information is needed to more fully clarify these findings in the area of course/instruction ratings in science methods courses.

Table 1

Distribution of Correlation Coefficients (r) Between

Student and Instructor Ideological Preferences

Range of Correlation Coefficient	Number of Scores
0.9000-1.000	0
0.8000-0.8999	7
0.7000-0.7999	11
0.6000-0.6999	21
0.5000-0.5999	26
0.4000-0.4999	28
0.3000-0.3999	26
0.2000-0.2999	22
0.1000-0.1999	16
0.0000-0.0999	4
Negative Correlation	8

Table 2a

Analysis of Variance Summary Table For

Instructor I on General Course Attitude

Source	SS	df	MS	F	P
Between Groups	15.5100	2	7.755	4.431	.0147
Within Groups	150.5121	86	1.7501		
Total	166.0221	88			

Table 2b

Means and Standard Deviations For Groups

Group	Number	Mean	Standard Deviation
Low	27	14.074	2.5708
Med	23	12.8696	2.9436
High	39	12.1024	2.5108

Table 3a

Analysis of Various Summary Table For

Instructor II on General Course Attitude

Source	SS	df	MS	F	P
Between Groups	38.4434	2	19.2217	3.801	.0266
Within Groups	389.3566	77	5.0566		
Total	427.8000	79			

Table 3b

Means and Standard Deviations for Groups

Group	Number	Mean	Standard Deviation
Low	22	11.5909	3.1571
Med	32	13.2500	1.4811
High	26	12.1923	2.1170

Table 4a

Analysis of Variance Summary Table For

Instructor II on Method of Instruction

Source	SS	df	MS	F	P
Between Groups	49.4135	2	24.7067	4.253	.0177
Within Groups	447.3365	77	5.8096		
Total	496.7500	79			

Table 4b

Means and Standard Deviations For Groups

Group	Number	Mean	Standard Deviation
Low	22	10.5000	3.1585
Med	32	12.3125	1.5541
High	26	10.9615	2.5531

Table 5a

Analysis of Variance Summary Table For

Instructor II on Overall Evaluation

Source	SS	df	MS	F	P
Between Groups	562.4865	2	281.2432	3.229	.0450
Within Groups	6706.7135	77	87.1002		
Total	7269.2000	79			

Table 5b

Means and Standard Deviation For Groups

Group	Number	Mean	Standard Deviation
Low	22	59.1364	11.7769
Med	32	65.4688	6.7297
High	26	61.3846	9.7778

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